

## **REMARKS**

In this response to the above identified Office Action, Applicants respectfully request reconsideration in view of the above amendments and the following remarks. Claims 1, 8, 11, 14, and 22 are amended. No claims are cancelled and no new claims are added. Accordingly, Claims 1-12 and 14-22 are pending in the application.

### **I. Claims Rejected Under 35 U.S.C. § 101**

The Examiner rejects Claims 17-21 under 35 U.S.C. § 101 as being directed to non-statutory subject matter. Examiner alleges that the claims are directed to a non-statutory subject matter. In response, Claim 17 is amended to recite:

A machine readable storage medium having instructions encoded therein which when executed cause a machine to perform a set of operations comprising. (Emphasis added.)

We submit that a machine readable storage medium having instructions encoded therein is directed to statutory subject matter in compliance with 35 U.S.C. § 101. Similar amendments are made to dependent Claims 18-21. In view of Applicant's amendment to Claims 17-21, we respectfully submit that Claims 17-21 are directed to statutory subject matter in compliance with 35 U.S.C. § 101. Consequently, we respectfully request that the Examiner reconsider and withdraw the rejection of Claims 17-21 under 35 U.S.C. § 101.

### **II. Claims Rejected Under 35 U.S.C. § 102**

Claims 1-10 and 14-21 stand rejected under 35 U.S.C. § 102(b) as being anticipated by an article by Gharachorloo et al., "Two Techniques to Enhance the Performance of Memory Consistency Models (1991)" ("Gharachorloo"). Applicant respectfully disagrees with the Examiner's assertions and characterizations of the cited reference.

Applicants respectfully submit that each and every element in the independent claims is not set forth in the cited reference. Claim 1 recites:

1. A method comprising:  
allocating issued store instructions within a store queue in program order;

allocating an entry for an issued load instruction in a structure for tracking only load instructions advanced by software, if the issued load instruction utilizes speculative data; and

flagging a field in a reorder buffer to indicate the speculative load instruction that uses speculative data is to be checked at retirement by a search of the structure to determine whether one of the in program order store instructions invalidates the speculative load instruction at the time of retirement. (Emphasis added.)

Gharachorloo is generally directed to two techniques to enhance the performance of memory consistency models where values are prefetched for accesses that are delayed due to consistency model constraints, even though the consistency model requires the memory access to be delayed. (See Abstract.) In contrast with Claim 1, Gharachorloo does not disclose or suggest allocating an entry for an issue load instruction and instruction for tracking only load instructions advanced by software, if the load instruction utilizes speculative data. Gharachorloo does disclose a speculative load buffer which provides a detection mechanism by signaling when speculative load results are incorrect (see page 6, right column, 3<sup>rd</sup> full paragraph), however, that is something completely different from allocating an entry for an issued load instruction in a structure for tracking only load instructions that are advanced by software, if the load instruction utilizes speculative data, as in Claim 1.

Furthermore, with regard to Claim 1, it includes the limitation of “flagging a field in a reorder buffer to indicate the load instruction that uses speculative data is to be checked at retirement by a search of the structure to determine whether one of the in program order store instructions invalidated the speculative load instruction at the time of retirement.” (Emphasis added.) Applicants do not believe that Gharachorloo teaches these elements of the claim.

Examiner cites Gharachorloo, at 2<sup>nd</sup> and 3<sup>rd</sup> full paragraphs, right col., p. 5, to teach that “[e]ach instruction, including the load instruction, is allocated a location in the reorder buffer . . . . That is, an entry (location) in the reorder buffer is flagged. This location tracks the program order of the instruction.” (Office Action, p. 4.) However, the location is not, in fact, flagged to indicate that the instruction is to be checked at retirement by a search of the structure to determine whether one of the in program order store instructions allocated within the store queue invalidates the speculative load instruction at the time of retirement, as in Claim 1. Although the allocation and deallocation of the location is involved in the reorder buffer’s function of

“allow[ing] the processor to execute [an] instruction[] past unresolved conditional branches by providing storage for the uncommitted results,” Gharachorloo, at 3<sup>rd</sup> full paragraph, lines 1-3, right col., p. 5, the cited sections do not mention any field being flagged to indicate that the instruction is to be checked at retirement to determine whether one of the in program order store instructions invalidated the speculative load instruction at the time of retirement, as in Claim 1. Further, a location does not constitute a discrete field in an entry, as recited in the claim. Thus, Gharachorloo does not teach each of the elements of Claim 1.

For each of the above reasons, therefore, Claim 1, and all claims which depend from Claim 1, are patentable over the cited art. Accordingly, reconsideration and withdrawal of the anticipation rejection of Claim 1 is requested.

Each of Applicant’s other independent claims include features similar to those highlighted above in Claim 1. With regard to independent Claims 8, 14 and 17, they have similar limitations to those of Claim 1 and Examiner has used similar arguments in his rejection. Thus, at least for the reasons mentioned above in regard to independent Claim 1, these claims are also not anticipated by Gharachorloo. Accordingly, reconsideration and withdrawal of the anticipation rejection of Claims 8, 14 and 17 based on Gharachorloo are requested.

Therefore, all of Applicant’s other independent claims, and all claims which depend on them, are patentable over the cited art for similar reasons. Consequently, we request that the Examiner reconsider and withdraw the §102(e) rejection of Claims 1-10 and 14-21.

### **III. Claims Rejected Under 35 U.S.C. § 103**

Claim 11 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Gharachorloo in view of Huck et al. “Introducing the IA-64 Architecture” (“Huck”). In addition, Claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Gharachorloo in view of Huck and further in view of Examiner’s taking of Official Notice.

Applicants respectfully submit that a *prima facie* case of obviousness has not been established.

With regard to independent Claim 11, it has similar limitations to those of Claim 1 and Examiner has used similar arguments in his rejection. Thus, at least for the reasons mentioned above in regard to independent Claim 1, Claim 11 is also not anticipated by Gharachorloo. Huck does not cure the defect of lacking an entry including a field indicating that the speculative load instruction is to be checked at retirement by a search of the structure to determine whether one of the in program order store instructions invalidates the speculative load instruction at the time of retirement, as in Claim 11. Applicants are unable to discern and Examiner does not identify any section of Huck that disclosures such a limitation. Therefore, the cited references do not, singularly or combined, teach or suggest the elements of these claims. Applicants respectfully request the withdrawal of the rejection of this claim under 35 U.S.C. § 103(a) as being unpatentable over Gharachorloo in view of Huck.

Claim 12 depends from Claim 11 and incorporates the limitations thereof. Thus, for at least the reasons mentioned above in regard to Claim 11, Gharachorloo does not teach or suggest each of the elements of this dependent claim. Huck and the Official Notice do not cure the deficiencies of Gharachorloo. Applicants respectfully request the withdrawal of the rejection of Claim 12 under 35 U.S.C. § 103(a) as being unpatentable over Gharachorloo in view of Huck and the Official Notice.

Claim 22 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Gharachorloo in view of Yoaz et al., “Speculation Techniques for improving Load Related Instruction Scheduling” (“Yoaz”).

Independent Claim 22 recites features similar to those highlighted above with reference to Claim 1 and the Examiner has used similar arguments in its rejection. Thus, for at least the reasons provided above with regard to independent Claim 1, Claim 22 is also not anticipated by Gharachorloo. Yoaz does not cure the defect of lacking an entry including a field indicating that the speculative load instruction has to be checked at retirement by a search of the structure to determine whether one of the in program order store instructions invalidates the speculative load instruction at the time of retirement, as in Claim 22. Applicants are unable to discern and the Examiner does not identify any section of Yoaz that disclose such a limitation. Therefore, the cited references do not singularly or combined teach or suggest the elements of these claims.

Applicants respectfully request that the Examiner withdraw the rejection of Claim 22 being unpatentable over Gharachorloo in view of Yoaz.

### CONCLUSION

In view of the foregoing, it is believed that all claims now pending (1) are in proper form, (2) are neither obvious nor anticipated by the relied upon art of record, and (3) are in condition for allowance. A Notice of Allowance is earnestly solicited at the earliest possible date. If the Examiner believes that a telephone conference would be useful in moving the application forward to allowance, the Examiner is encouraged to contact the undersigned at (310) 207-3800.

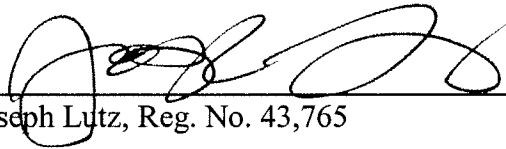
If necessary, the Commissioner is hereby authorized in this, concurrent and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2666 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17, particularly, extension of time fees.

Respectfully submitted,

BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP

Dated: \_\_\_\_\_

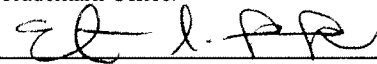
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Joseph Lutz, Reg. No. 43,765

1279 Oakmead Parkway  
Sunnyvale, California 94085-4040  
Telephone (310) 207-3800  
Facsimile (408) 720-8383

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